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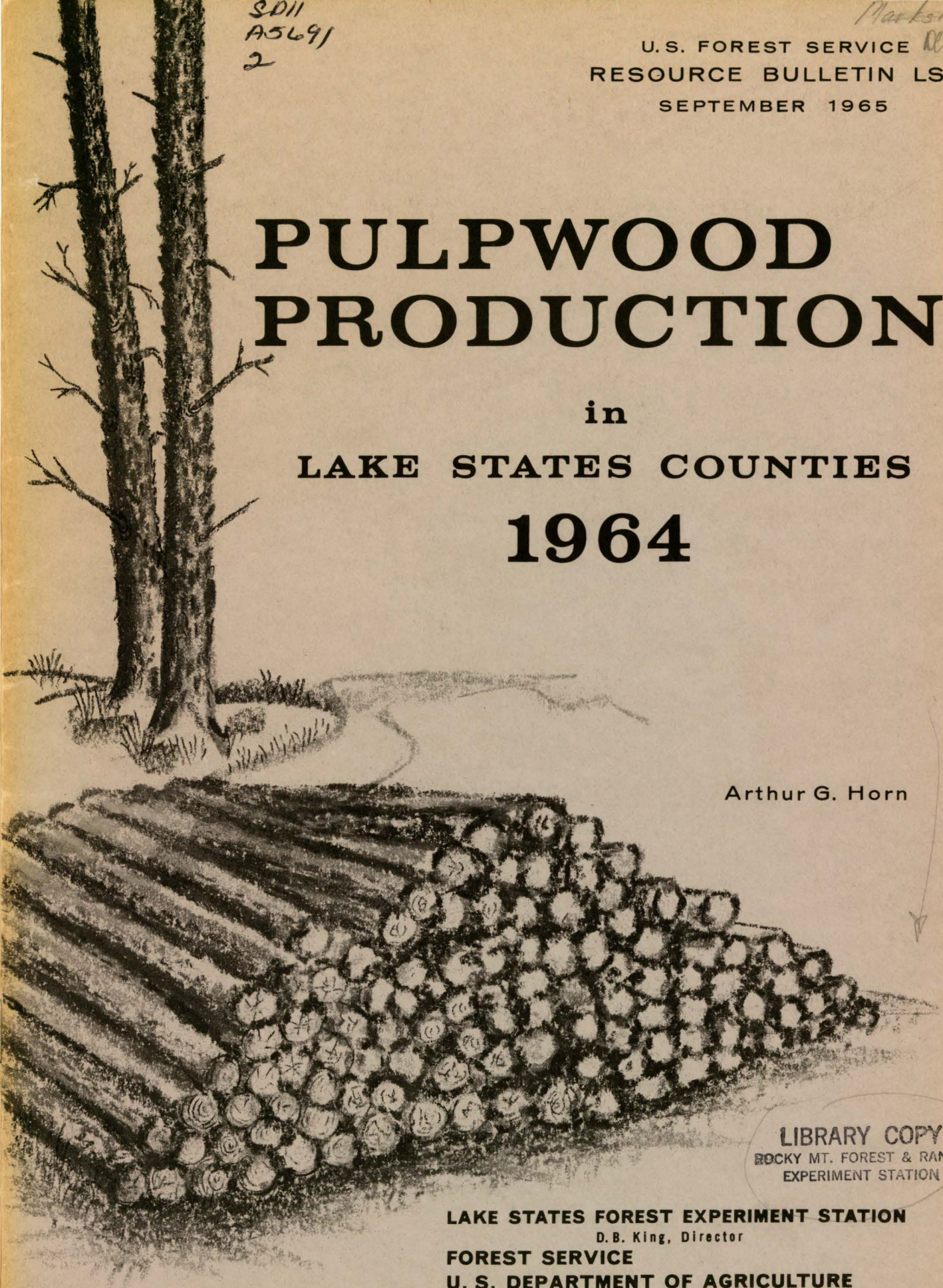
U.S. FOREST SERVICE
RESOURCE BULLETIN LS-2
SEPTEMBER 1965

PULPWOOD PRODUCTION

in LAKE STATES COUNTIES

1964



Arthur G. Horn

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EXPERIMENT STATION

LAKE STATES FOREST EXPERIMENT STATION
D.B. King, Director
FOREST SERVICE
U. S. DEPARTMENT OF AGRICULTURE

ABOUT THIS REPORT

The volume of timber removed from Lake States forests varies from year to year. Frequent measurement is required to maintain a current and meaningful picture of the relationships between timber removal, timber growth, and desirable cut. To partially meet this need the Station publishes summaries of the output of various timber products as often as reliable data can be accumulated. Reports of Lake States pulpwood output by States have been published each year since 1946.

This is the sixth annual report on the pulpwood harvest in Lake States counties. The pulpmills using Lake States timber in 1964 furnished figures showing the geographic origin of their pulpwood receipts by State and county. Their active cooperation is gratefully acknowledged. Thanks are due also to Ray Pfeifer, Forest Survey Coordinator, Michigan Department of Conservation, for collecting data for the Michigan pulpmills. Robert Knutson, Lake States Forest Experiment Station, programmed the computing of the pulpmill data.

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1964 PULPWOOD BRIEFS

Lake States Pulpwood Production Continues at High Level

The 1964 harvest of pulpwood in the Lake States amounted to approximately 3,628,000 cords, 1 percent less than the all-time high recorded in 1963. Ninety-six percent of the pulpwood production was roundwood, while the remaining 4 percent was wood residue supplied by local primary wood-using plants. Most of the wood residue was delivered to pulpmills in the form of chips. Fifty-five pulp plants obtained pulpwood from the Lake States in 1964: 50 local plants and 5 in the Central States and Canada. Pulpwood exports were about 33,000 cords. Of this amount, 68 percent was spruce, balsam, and miscellaneous hardwood bolts; the remaining 32 percent was made up of hardwood wood chips and small amounts of sawdust.

Production of several species showed decreases from the previous year. Balsam fir, spruce, and hemlock declined the most, dropping 18, 4, and 4 percent respectively. Wood residues delivered to pulpmills were down 4 percent. Aspen, birch, and pine, on the other hand, showed increases. The cut of the maples, oaks, and other dense hardwoods as a group was almost identical with that of the previous year.

Lake States forests continue to supply about 90 percent of the raw wood used by the local woodpulp industry. Pulpwood operations in Canada and several of the Western States furnished about 10 percent of the wood consumed by Lake States mills in 1964. Aspen, pine, and spruce were the most widely used species. Broader acceptance of miscellaneous dense hardwood bolts for pulping was evident, as 19 local mills procured such wood in 1964 compared to only 17 the previous year.

Review of Pulpwood Production by States, 1964

Of the 3,628,000 cords of pulpwood harvested in the region during 1964, Michigan produced 37 percent, Wisconsin 34 percent, and Minnesota 29 percent.

Table 1 shows the number of plants using the various pulping species in 1964. Figures 1 and 2 show the amount of cut relative to commercial forest area by county and relative to merchantable timber volume by Forest Survey District.

NOTE: The author, Arthur G. Horn, is a Market Analyst on the staff of the Lake States Forest Experiment Station, which is maintained at St. Paul, Minn., by the Forest Service, U. S. Department of Agriculture, in cooperation with the University of Minnesota.

TABLE 1. — *Number of plants using the different species of wood for pulping in 1964*

Species and kind of material	Lake States	Minn.	Wis.	Mich.
Aspen	41	7	24	10
Balsam fir	27	6	16	5
Birch	9	—	6	3
Hemlock	6	—	5	1
Pine	13	4	5	4
Spruce	27	5	17	5
Tamarack	5	—	4	1
Misc. hardwoods	19	3	11	5
Wood chips	8	1	6	1
Slabwood and other residue	3	—	2	1
Total plants	50	9	29	12

The Michigan harvest. — Michigan's annual pulpwood harvest continues to grow as wood requirements of resident mills increase. In 1964 Michigan produced 1,321,000 cords of pulpwood, 2 percent more than in the previous year. Resident mills received 55 percent of the pulpwood harvested by local cutters in 1964. The western Upper Michigan counties, as a group, were the largest exporters of pulpwood to Wisconsin mills. Aspen, pine, and miscellaneous dense hardwoods were the principal pulpwood species cut in the State, accounting for 51, 15, and 10 percent respectively of the total volume harvested.

A total of 66 Michigan counties contributed to the pulpwood cut in 1964. The largest pulpwood cuts came from the Counties of Menominee (88,000 cords), Marquette (85,000 cords), and Delta (71,000 cords). Menominee County made the largest cut of aspen pulpwood, and Ontonagon County the largest cut of miscellaneous dense hardwoods for pulpwood. Northern Lower Michigan counties, as a group, were the largest pulpwood gainers, posting an increase of 10 percent over that of the previous year.

The Wisconsin harvest. — Wisconsin's pulpwood harvest amounted to approximately 1,244,000 cords in 1964. This was about 5 percent less than the all-time high of 1,302,000 cords recorded in 1963. This mild setback was not precipitated by a decline in the output of any single species, or groups of species; slight to moderate declines were general throughout. Imports of pulpwood from other States and Canada declined as well. The total amount of pulpwood delivered to Wisconsin mills was 7 percent less than in 1963. Wisconsin's share of the regional pulpwood harvest has increased from 25 percent to about 35 percent during the past few years.

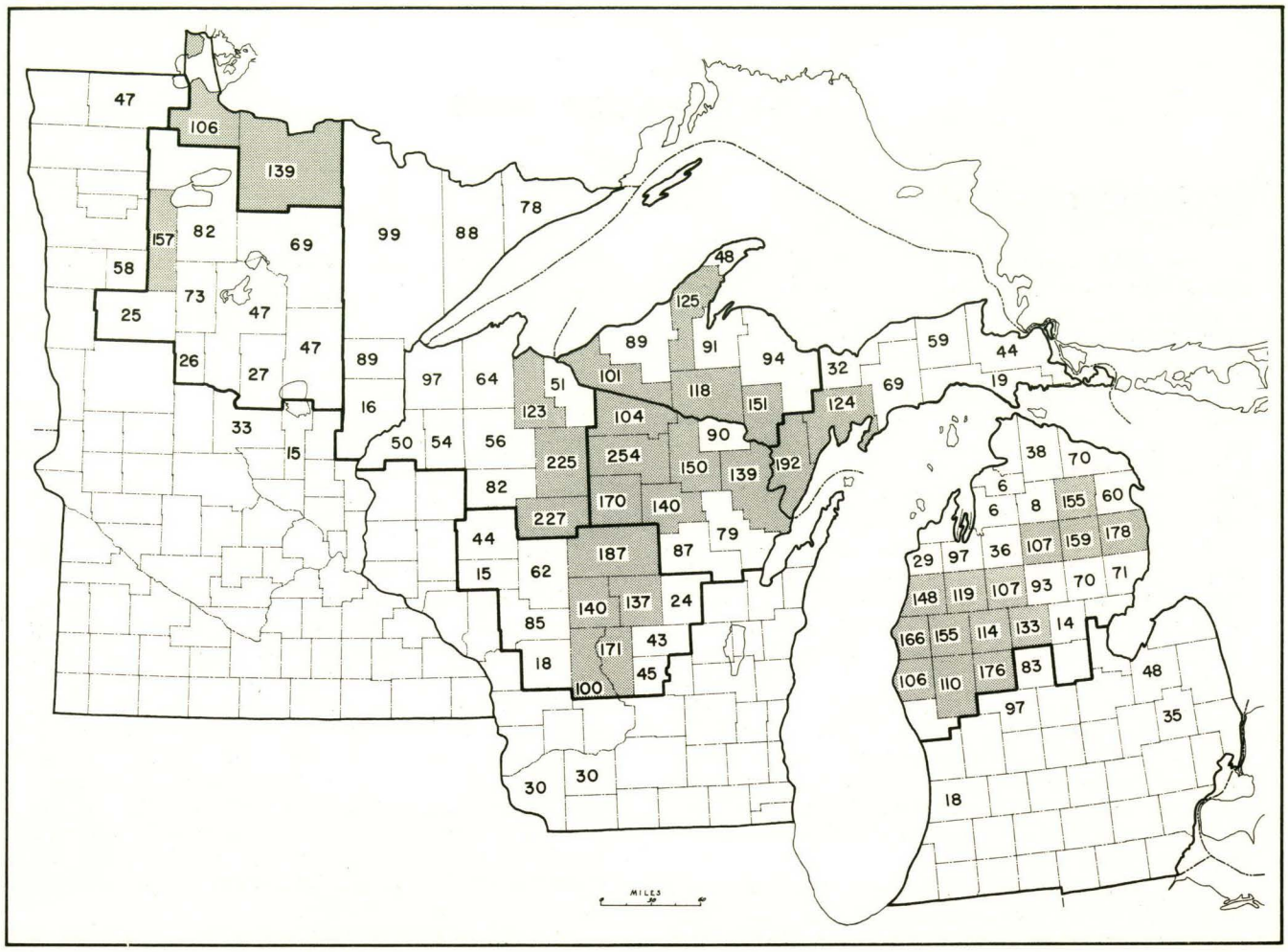


FIGURE 1. — Cords of pulpwood cut per 1,000 acres of stocked commercial forest land in the principal pulpwood-producing counties, 1964. Cross-hatching shows counties that supplied 100 or more cords of pulpwood per 1,000 acres of stocked commercial forest land. The heavy lines delineate the boundaries of the Forest Survey Districts in each State.

With the steady increase in the demand for pulpwood, nearly 50 Wisconsin counties contribute to the annual cut compared to some 30 counties a few years ago. In 1964 Oneida, Price, and Forest Counties yielded the largest quantities of pulpwood. The largest aspen cut was in Oneida County; Price County produced more miscellaneous hardwood bolts than any other county; and Douglas County yielded the largest cut of pine. The cut in the other northern and central counties was down, while southern counties posted slight increases.

The Minnesota harvest. — Minnesota's annual pulpwood harvest has approximated 1 million cords for a number of years. The pulpwood cut in 1964 was no exception; it totaled 1,063,000 cords — the same as in 1963. Continuing a trend established several years ago, resident pulpmills obtained larger proportions of aspen, pine, and spruce pulpwood from Minnesota timber.

A total of 23 Minnesota counties contributed to the pulpwood harvest. St. Louis, Koochiching, and Itasca made the largest cuts. St. Louis County yielded the largest cut of aspen, while Koochiching County was the leader in spruce. The cutting pattern by counties was about the same as in 1963, with no substantial increases or decreases in cut registered in any one county.

Wood chips were produced in larger quantities in 1964; production totaled nearly 5,000 cords compared with about 1,000 cords in 1963. Additional chipping facilities installed at several new locations indicate a trend toward fuller utilization of plant wood residues by the local sawmilling industry.

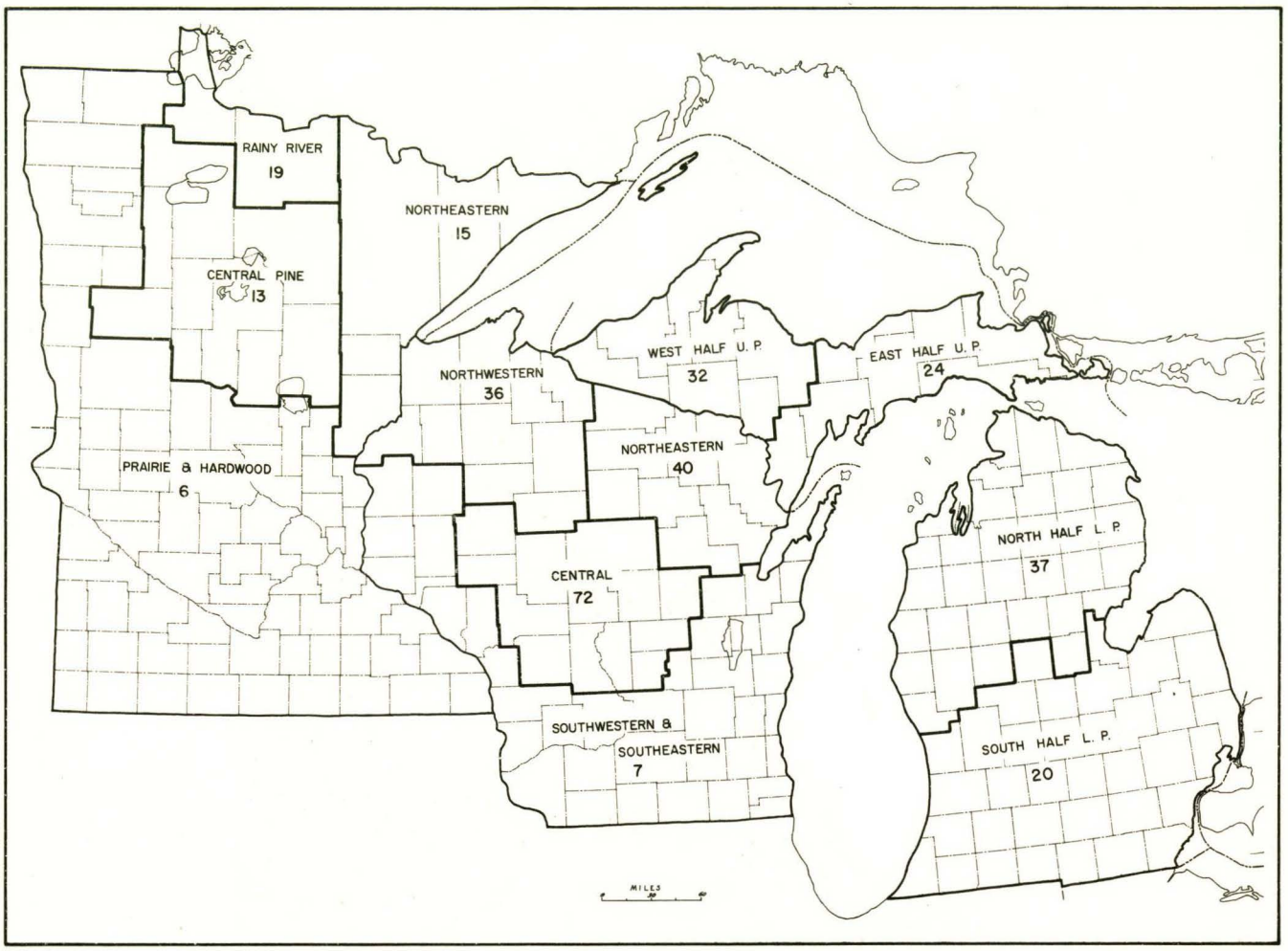


FIGURE 2. — Cords of pulpwood bolts and logs harvested per thousand cords of merchantable volume in principal pulpwood species, by Forest Survey District, 1964.

The Aspen Pulpwood Story

In the Lake States large supplies of aspen timber have been available for use by forest product industries for many years. Timber cutters have harvested a variety of rough forest products from these stands each year, with pulpwood, saw logs, box-bolts, and fuelwood accounting for most of the cut. The rate of cut has been steadily increasing. Station records show that aspen cut for all products was about 1,700,000 cords in 1936 compared with the present cut of about 2,400,000 cords. Although the current annual cut is considerably larger than that of a few years ago, its rate of increase has been tempered by smaller annual cuts of fuelwood, fence posts, excelsior, veneer logs, and heading stock.

Without the upsurge in demand for aspen pulpwood during the past few years, the once despised aspen might still have failed to achieve the status of a valuable timber species. Aspen now is the principal pulpwood species in the Lake States, a position attained because of technological advances permitting more general use of shorter fibered pulps.

Lake States production of aspen for pulpwood (fig. 3) at approximately 10-year intervals since 1936 is as follows:

	Thousand cords
1936	94
1946	714
1956	1,397
1964	1,728

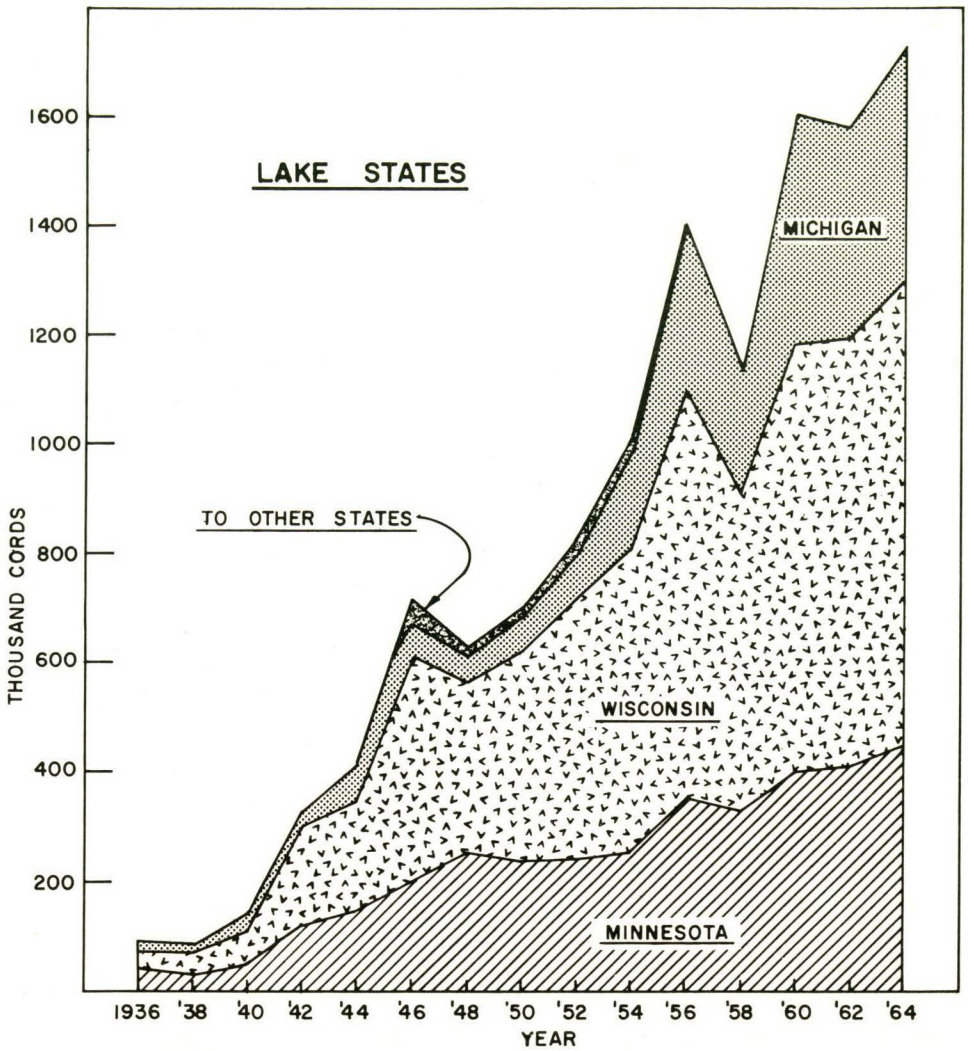


FIGURE 3. — The trend in use of aspen pulpwood produced in the Lake States by State, 1936-1964.

The Lake States area is not a large exporter of aspen pulpwood. Except for a few thousand cords exported annually to Central States mills between 1945 and 1955 all aspen pulpwood was delivered to Lake States pulpmills for processing.

Of the three Lake States, Michigan is the only one that harvests more aspen pulpwood than it consumes each year. Michigan timber cutters harvested approximately 674,000 cords of aspen pulpwood in 1964. Of this about 249,000 cords were shipped to out-of-State mills. This is a record cut for Michigan and represents a vast increase over the volumes produced in the 1930's (fig. 4). The sharp upward trend in production started in 1944 and has been rising, almost without interruption, ever since.

Wisconsin also has registered some substantial increases in the output of aspen pulpwood; the annual harvests, however, still fall short of meeting the annual consumption of its pulpmills. The cut in 1964 amounted to approximately 603,000 cords, which was augmented by an additional 269,000 cords of imports. The 1964 harvest was nearly twice the amount produced 10 years ago and nearly 30 times the amount produced in 1936 (fig. 5). In recent years aspen stands in several central Wisconsin counties have been heavily cut. This condition was alleviated somewhat in 1964 with a better distribution of aspen pulpwood cutting throughout the State.

Minnesota has the largest volume of aspen timber in the Lake States, but the annual cut of aspen pulpwood has never quite reached the volume consumed annually by its resident mills. In 1964 the cut of aspen pulpwood amounted to approximately 451,000 cords — nearly twice the amount cut 10 years ago and more than 10 times

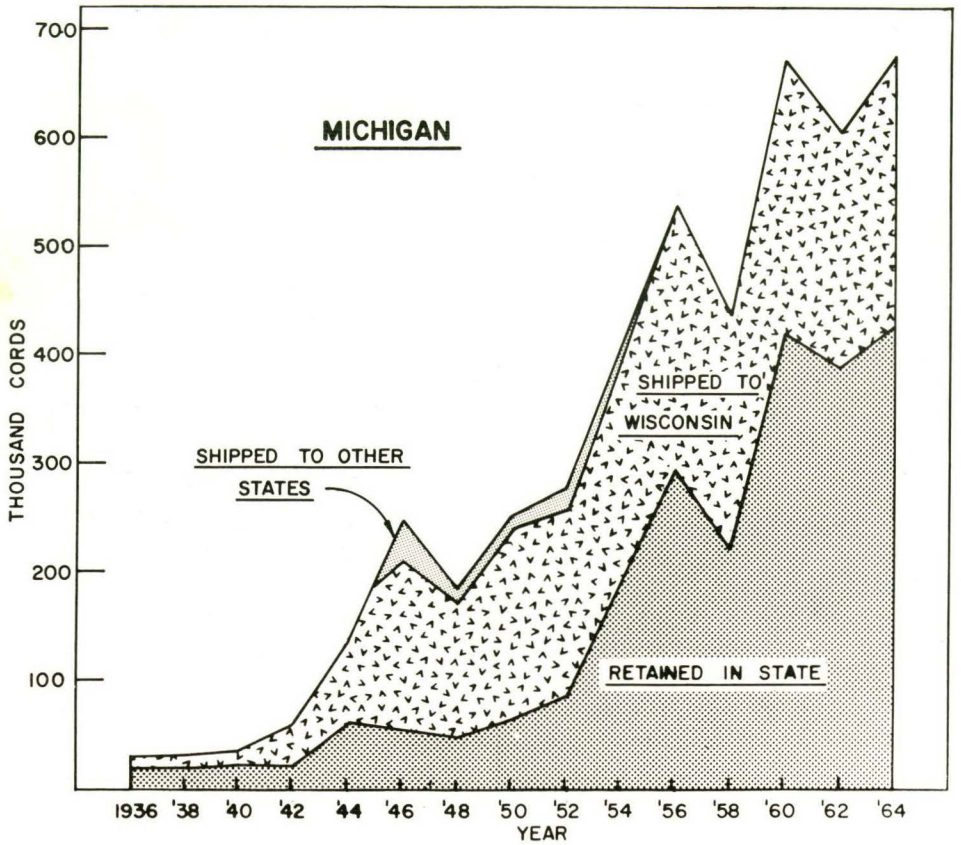


FIGURE 4. — The trend in aspen pulpwood production in Michigan and its destination by State, 1936-1964.

the volume produced in 1936 (fig. 6). Minnesota has never been a large importer or exporter of aspen pulpwood. Only 3 out-of-State pulpmills received aspen pulpwood from Minnesota suppliers in 1964.

To produce 1,728,000 cords of aspen pulpwood in the Lake States required the felling, bucking, and limbing of about 12½ million trees (table 2). With operable aspen stands averaging about 12 cords per acre, an estimated 150,000 acres were logged over to yield this amount of pulpwood. Of the timber removed, about 55 percent was pole-timber-sized trees and the remaining 45 percent was sawtimber-sized trees. Cutting was the heaviest in the smaller-sized trees; trees with diameters ranging from 7 to 12 inches d.b.h. accounted for nearly two-thirds of the cut.

The typical aspen tree was 9¼ inches d.b.h. and 62 feet tall. It contained 5 pulpwood sticks with

TABLE 2. — *Estimate of the volume and number of trees cut for pulpwood by DBH, Lake States, 1964*

DBH	Pulpwood harvest	
	Thousands of cords	Thousands of trees
4	*	—
5	12	445
6	79	1,659
7	145	1,914
8	199	1,910
9	240	1,824
10	275	1,650
11	219	1,117
12	204	877
13	145	479
14	97	281
15	62	174
16	35	91
17	16	40
Total	1,728	12,461

* Less than 500 cords.

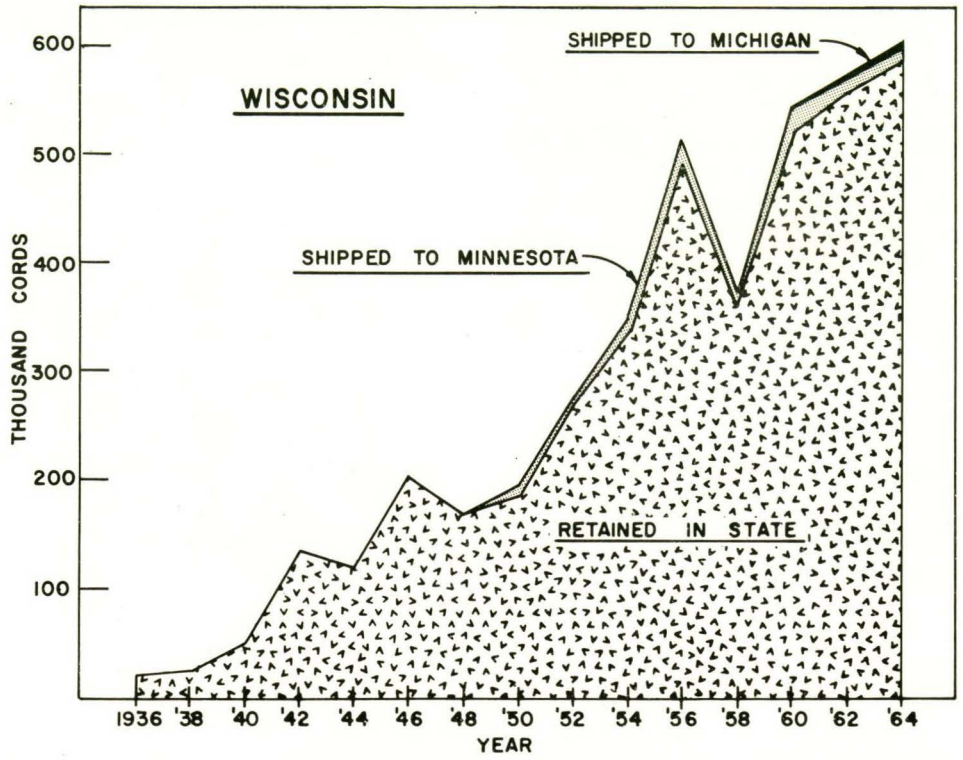


FIGURE 5. — The trend in aspen pulpwood production in Wisconsin and its destination by State, 1936-1964.

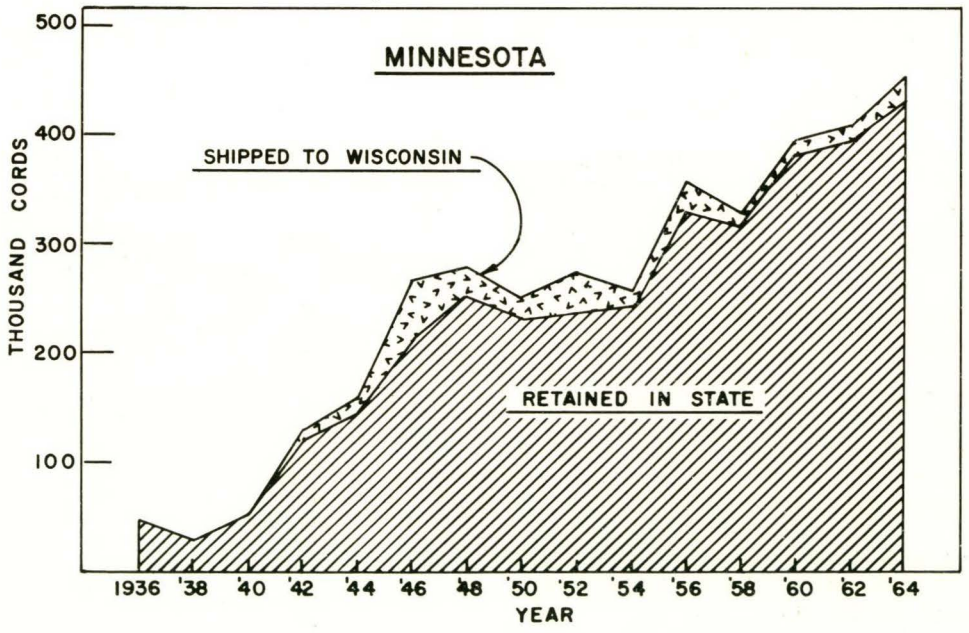


FIGURE 6. — The trend in aspen pulpwood production in Minnesota and its destination by State, 1936-1964.

a merchantable volume of 11.3 cubic feet (table 3).[1] Of the total pulpwood harvest, about 95.5 percent was cut from growing stock and 4.5 percent from cull and dead trees, saplings, and limbwood. Utilization of aspen pulpwood timber was much improved over that of a few years ago. Logging residue resulting from present-day operations amounts to about 4 percent of the total cut, much less than the 8 to 10 percent that used to be common. Recent studies show that the percent of logging residue generally increases with the size of tree.

[1] *Based on data collected during recent timber product conversion factor studies, which required measuring and diagraming nearly 1,000 sample felled aspen trees at many widely scattered "going" logging operations in Minnesota and Michigan.*

TABLE 3. — *Number of trees and bolts per cord of pulpwood and average volume per bolt, by DBH class, Lake States, 1964*

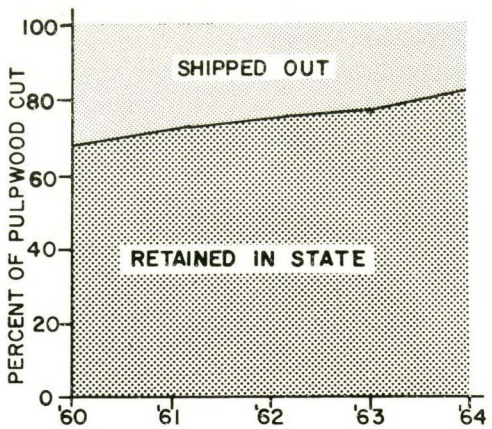
DBH	Per cord[1]		Cu. ft. volume per bolt
	Number of trees	Number of bolts	
5	37.1	111	0.7
6	21.0	65	1.2
7	13.2	52	1.5
8	9.6	41	1.9
9	7.6	35	2.2
10	6.0	29	2.7
11	5.1	24	3.2
12	4.3	21	3.7
13	3.3	17	4.6
14	2.9	15	5.2
15	2.8	14	5.6
16	2.6	13	6.0
17	2.5	12	6.5
Weighted average	7.2	34	2.3

[1] *78 cubic feet solid wood.*

PULPWOOD PRODUCTION BY STATE OF ORIGIN AND DESTINATION, PAST FIVE YEARS

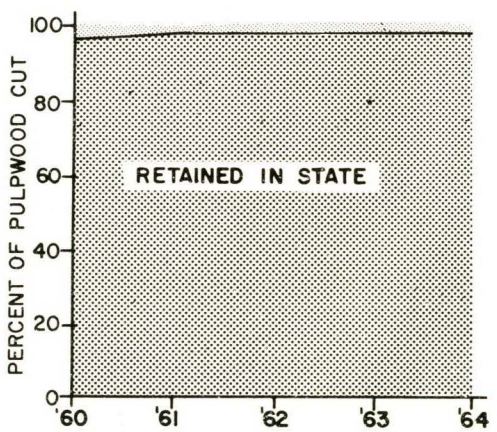
MINNESOTA

Year	Total cut	Destination of pulpwood			
		Minn.	Wis.	Mich.	Other
	(Thousand standard cords)				
1960	1,048	711	308	-	29
1961	968	712	240	-	16
1962	979	753	216	1	9
1963	1,063	828	221	-	14
1964	1,062	856	193	-	13
5-year average	1,024	772	236	-	16



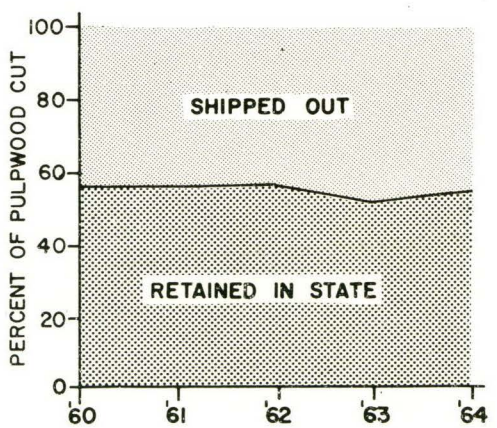
WISCONSIN

Year	Total cut	Destination of pulpwood			
		Minn.	Wis.	Mich.	Other
	(Thousand standard cords)				
1960	1,052	19	1,008	-	25
1961	1,078	14	1,050	1	13
1962	1,140	15	1,114	1	10
1963	1,302	20	1,262	2	18
1964	1,244	19	1,207	2	16
5-year average	1,163	17	1,128	1	17



MICHIGAN

Year	Total cut	Destination of pulpwood			
		Minn.	Wis.	Mich.	Other
	(Thousand standard cords)				
1960	1,237	-	510	727	-
1961	1,106	-	464	628	14
1962	1,223	-	540	677	6
1963	1,297	-	633	664	-
1964	1,321	-	588	730	3
5-year average	1,236	-	547	685	4



PULPWOOD PRODUCTION BY FOREST SURVEY DISTRICTS AND DESTINATION BY STATES, 1964

MINNESOTA

District	Total cut	Destination of pulpwood			
		Minnesota	Wisconsin	Michigan	Other
	(Thousand standard cords, roughwood basis)				
Northeastern	459	301	158	-	*
Central Pine	339	305	33	-	1
Rainy River	236	223	1	-	12
Hardwood & Prairie	28	27	1	-	1
Total	1,062	856	193	-	13

WISCONSIN

District	Total cut	Destination of pulpwood			
		Minnesota	Wisconsin	Michigan	Other
	(Thousand standard cords, roughwood basis)				
Northeastern	543	-	540	2	1
Northwestern	455	16	439	-	*
Central	225	-	220	-	5
Southeastern & Southwestern	21	3	8	-	10
Total	1,244	19	1,207	2	16

MICHIGAN

District	Total cut	Destination of pulpwood			
		Minnesota	Wisconsin	Michigan	Other
	(Thousand standard cords, roughwood basis)				
E. ½ Up. Pen.	282	-	220	61	1
W. ½ Up. Pen.	468	-	368	98	2
N. ½ Low.Pen.	539	-	-	539	-
S. ½ Low.Pen.	32	-	-	32	-
Total	1,321	-	588	730	3

* Less than 500 cords.

PULPWOOD PRODUCTION BY SPECIES, STATE, AND FOREST SURVEY DISTRICTS FOR SPECIFIED YEARS

ASPEN

State and district	Annual production				
	1960	1961	1962	1963	1964
	(Thousand standard cords, roughwood basis)				
MINNESOTA:					
Northeastern	150	152	170	181	176
Central Pine	158	137	146	150	172
Rainy River	77	74	83	94	91
Prairie & Hardwood	7	6	7	8	12
Total	392	369	406	433	451
WISCONSIN:					
Northeastern	281	280	301	321	332
Northwestern	212	203	210	219	208
Central	45	46	54	71	61
Southeastern & Southwestern	2	1	7	2	2
Total	540	530	572	613	603
MICHIGAN:					
E. ½ Up. Pen.	111	91	96	122	112
W. ½ Up. Pen.	173	168	174	203	206
N. ½ Low.Pen.	355	280	305	314	332
S. ½ Low.Pen.	30	19	26	23	25
Total	669	558	601	662	675
Lake States	1,601	1,457	1,579	1,708	1,729

BALSAM FIR

State and district	Annual production				
	1960	1961	1962	1963	1964
	(Thousand standard cords, roughwood basis)				
MINNESOTA:					
Northeastern	62	47	38	31	26
Central Pine	49	35	40	38	32
Rainy River	33	29	32	33	31
Prairie & Hardwood	1	*	-	*	*
Total	145	111	110	102	89
WISCONSIN:					
Northeastern	25	30	24	33	27
Northwestern	24	30	22	27	29
Central	1	1	*	1	1
Southeastern & Southwestern	-	*	*	*	*
Total	50	61	46	61	57
MICHIGAN:					
E. ½ Up. Pen.	73	58	56	63	47
W. ½ Up. Pen.	55	48	44	50	33
N. ½ Low.Pen.	7	9	4	8	4
S. ½ Low.Pen.	-	-	-	-	-
Total	135	115	104	121	84
Lake States	330	287	260	284	230

* Less than 500 cords.

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(Pulpwood production cont'd)

State and district	JACK PINE[1/] Annual production					SPRUCE Annual production				
	1960	1961	1962	1963	1964	1960	1961	1962	1963	1964
	(Thousand standard cords, roughwood basis)									
MINNESOTA:										
Northeastern	138	127	126	136	129	146	131	114	125	118
Central Pine	64	56	53	50	49	42	35	40	39	50
Rainy River	13	13	13	14	17	67	70	63	90	88
Prairie & Hardwood	10	9	9	8	9	1	4	*	1	1
Total	225	205	201	208	204	256	240	217	255	257
WISCONSIN:										
Northeastern	38	42	42	45	48	11	13	8	14	13
Northwestern	53	35	71	53	51	6	10	6	5	6
Central	29	73	70	69	68	1	*	1	*	*
Southeastern & Southwestern	4	4	5	3	1	-	-	*	*	*
Total	124	154	188	170	168	18	23	15	19	19
MICHIGAN:										
E. ½ Up. Pen.	51	38	61	54	51	52	45	41	37	33
W. ½ Up. Pen.	22	13	29	36	40	49	44	41	46	35
N. ½ Low.Pen.	114	103	93	84	106	7	7	4	5	3
S. ½ Low.Pen.	1	2	1	*	1	-	-	-	-	-
Total	188	156	184	174	198	108	96	86	88	71
Lake States	537	515	573	552	570	382	359	318	362	347

1/ Includes small quantity of red and white pine.

* Less than 500 cords.

(Cont'd on next page)

(Pulpwood production cont'd)

BIRCH

State and district	Annual production				
	1960	1961	1962	1963	1964
	(Thousand standard cords, roughwood basis)				
MINNESOTA:					
Northeastern	*	*	*	*	-
Central Pine	1	1	2	*	*
Rainy River	-	-	-	*	-
Prairie & Hardwood	-	-	-	*	-
Total	1	1	2	*	*
WISCONSIN:					
Northeastern	4	12	4	8	8
Northwestern	19	21	31	36	28
Central	4	1	6	6	5
Southeastern & Southwestern	-	*	-	*	*
Total	27	34	41	50	41
MICHIGAN:					
E. ½ Up. Pen.	3	6	5	11	14
W. ½ Up. Pen.	2	5	3	4	6
N. ½ Low.Pen.	4	5	13	8	18
S. ½ Low.Pen.	-	-	-	-	-
Total	9	16	21	23	38
Lake States	37	51	64	73	79

HEMLOCK

State and district	Annual production				
	1960	1961	1962	1963	1964
	(Thousand standard cords, roughwood basis)				
MINNESOTA:					
Northeastern	-	-	-	-	-
Central Pine	-	-	-	-	-
Rainy River	-	-	-	-	-
Prairie & Hardwood	-	-	-	-	-
Total	-	-	-	-	-
WISCONSIN:					
Northeastern	17	18	21	25	27
Northwestern	27	25	18	24	22
Central	8	4	3	3	3
Southeastern & Southwestern	-	*	*	*	-
Total	52	47	42	52	52
MICHIGAN:					
E. ½ Up. Pen.	3	2	3	6	10
W. ½ Up. Pen.	43	42	54	56	49
N. ½ Low.Pen.	-	-	-	-	-
S. ½ Low.Pen.	-	-	-	*	-
Total	46	44	57	62	59
Lake States	98	91	99	114	111

* Less than 500 cords.

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(Pulpwood production cont'd.)

State and district	TAMARACK Annual production					MISC. HARDWOODS Annual production				
	1960	1961	1962	1963	1964	1960	1961	1962	1963	1964
	(Thousand standard cords, roughwood basis)									
MINNESOTA:						MINNESOTA:				
Northeastern	5	3	6	9	7	Northeastern	1	1	4	4	3
Central Pine	11	5	3	4	5	Central Pine	*	21	21	35	29
Rainy River	3	*	-	-	-	Rainy River	9	9	9	9	9
Prairie & Hardwood	-	*	-	*	*	Prairie & Hardwood	-	3	*	3	3
Total	19	8	9	13	12	Total	10	34	34	51	44
WISCONSIN:						WISCONSIN:					
Northeastern	4	2	2	1	1	Northeastern	73	52	46	50	44
Northwestern	2	5	4	5	3	Northwestern	63	67	67	100	93
Central	*	*	*	*	*	Central	61	74	69	74	75
Southeastern & Southwestern	-	-	*	*	-	Southeastern & Southwestern	7	8	6	9	12
Total	6	7	6	6	4	Total	204	201	188	233	224
MICHIGAN:						MICHIGAN:					
E. ½ Up. Pen.	2	2	3	1	2	E. ½ Up. Pen.	4	2	13	2	7
W. ½ Up. Pen.	3	2	1	2	1	W. ½ Up. Pen.	43	37	58	54	60
N. ½ Low.Pen.	-	-	-	-	-	N. ½ Low.Pen.	16	46	67	70	76
S. ½ Low.Pen.	-	-	-	-	-	S. ½ Low.Pen.	12	11	6	5	3
Total	5	4	4	3	3	Total	75	96	144	131	146
Lake States	30	19	19	22	19	Lake States	289	331	366	415	414

* Less than 500 cords.

(Cont'd on next page)

(Pulpwood production cont'd.)

State and district	RESIDUE & CHIPS 1/ Annual production					ALL SPECIES 2/ Annual production				
	1960	1961	1962	1963	1964	1960	1961	1962	1963	1964
	(Thousand standard cords, roughwood basis)									
MINNESOTA:						MINNESOTA:				
Northeastern	-	-	-	-	-	Northeastern	502	461	458	486	459
Central Pine	-	-	-	-	2	Central Pine	325	290	305	316	339
Rainy River	-	-	-	-	-	Rainy River	202	195	200	240	236
Prairie & Hardwood	-	-	*	1	3	Prairie & Hardwood	19	22	16	21	28
Total	-	-	*	1	5	Total	1,048	968	979	1,063	1,062
WISCONSIN:						WISCONSIN:					
Northeastern	13	9	18	55	43	Northeastern	466	458	466	552	543
Northwestern	10	7	14	19	15	Northwestern	416	403	443	488	455
Central	6	4	8	19	12	Central	155	203	211	243	225
Southeastern & Southwestern	2	1	2	5	6	Southeastern & Southwestern	15	14	20	19	21
Total	31	21	42	98	76	Total	1,052	1,078	1,140	1,302	1,244
MICHIGAN:						MICHIGAN:					
E. ½ Up. Pen.	-	-	*	8	6	E. ½ Up. Pen.	299	249	278	304	282
W. ½ Up. Pen.	2	21	22	25	38	W. ½ Up. Pen.	392	375	426	476	468
N. ½ Low.Pen.	-	-	-	-	-	N. ½ Low.Pen.	503	450	486	489	539
S. ½ Low.Pen.	-	-	-	-	3	S. ½ Low.Pen.	43	32	33	28	32
Total	2	21	22	33	47	Total	1,237	1,106	1,223	1,297	1,321
Lake States	33	42	64	132	128	Lake States	3,337	3,152	3,342	3,662	3,627

1/ Not reported by district. Prorated on basis of most recent lumber output figures.

2/ Including residues and chips.

* Less than 500 cords.

PULPWOOD PRODUCTION BY COUNTY AND SPECIES, 1964

MINNESOTA

District & county[1]	All species	Aspen	Balsam	Birch	Pine	Spruce	Tamarack	Misc. hdwds.	Residue & chips[2]
	(Thousand standard cords, roughwood basis)								
NORTHEASTERN:									
Carlton	27	22	2	-	2	1	-	-	
Cook	51	1	4	-	4	42	-	-	
Lake	89	12	2	-	54	21	-	-	
Pine	6	2	*	-	3	*	-	1	
St. Louis	286	139	18	-	66	54	7	2	
Total	459	176	26	-	129	118	7	3	-
CENTRAL PINES:									
Aitkin	33	26	2	-	2	2	1	*	
Becker	9	8	*	-	1	*	1	1	
Beltrami	67	30	11	*	5	17	1	3	
Cass	43	16	3	-	13	2	2	7	
Clearwater	51	28	2	-	2	2	*	17	
Crow Wing	11	1	*	-	9	1	-	-	
Hubbard	30	23	*	-	6	1	-	-	
Itasca	90	40	14	-	8	25	1	2	
Wadena	3	*	-	-	3	-	-	-	
Total	339	172	32	*	49	50	5	29	2
RAINY RIVER:									
Koochiching	194	83	24	-	10	68	-	9	
Lake of the Woods	42	8	7	-	7	20	-	-	
Total	236	91	31	-	17	88	-	9	-
HARDWOOD:									
Mille Lacs	2	-	-	-	-	-	-	2	
Morrison	6	5	*	-	1	*	-	-	
Scott	*	-	*	-	-	-	-	-	
Todd	*	-	-	-	*	-	-	-	
Total	11	5	*	-	1	*	-	2	3
PRAIRIE:									
Mahnomen	7	6	-	-	-	-	-	1	
Polk	1	-	-	-	-	1	*	-	
Roseau	9	1	*	-	8	*	-	-	
Total	17	7	*	-	8	1	*	1	-
State total	1,062	451	89	*	204	257	12	44	5

1/ Includes only those counties that supplied pulpwood in 1964.

2/ County figures are not available.

* Less than 500 cords.

PULPWOOD PRODUCTION BY COUNTY AND SPECIES, 1964

WISCONSIN

District & county[1]	All species	Aspen	Balsam	Birch	Hemlock	Pine	Spruce	Tamarack	Misc. hdwds.	Residue & chips[2]
	(Thousand standard cords, roughwood basis)									
NORTHEASTERN:										
Florence	22	16	1	*	2	1	1	-	1	
Forest	76	56	6	*	7	3	2	*	2	
Langlade	48	31	2	1	1	*	1	*	12	
Lincoln	55	38	1	1	1	4	1	*	9	
Marinette	75	46	6	-	5	13	2	*	3	
Oconto	29	23	1	*	3	2	*	-	*	
Oneida	122	78	7	3	3	14	5	1	11	
Shawano	31	25	1	-	3	1	*	-	1	
Vilas	42	19	2	3	2	10	1	*	5	
Total	543	332	27	8	27	48	13	1	44	43
NORTHWESTERN:										
Ashland	60	27	12	2	3	1	1	*	14	
Bayfield	47	27	2	5	1	8	1	*	3	
Burnett	14	2	-	*	-	11	*	1	*	
Douglas	49	23	1	1	*	19	1	1	3	
Iron	19	9	3	1	3	*	1	-	2	
Price	108	56	6	11	5	1	1	*	28	
Rusk	25	12	*	*	1	-	*	*	12	
Sawyer	32	13	3	6	3	1	*	1	5	
Taylor	68	35	2	1	6	*	*	*	24	
Washburn	18	4	*	1	*	10	1	*	2	
Total	455	208	29	28	22	51	6	3	93	15
CENTRAL:										
Adams	34	5	-	-	-	16	-	-	13	
Chippewa	9	8	*	*	-	*	*	*	1	
Clark	16	9	*	1	*	2	*	-	4	
Eau Claire	2	1	-	-	-	1	-	-	-	
Jackson	25	3	-	-	-	18	-	-	4	
Juneau	22	4	-	-	-	14	-	-	4	
Marathon	55	21	1	4	2	1	*	*	26	
Marquette	3	*	-	-	-	*	-	-	3	
Monroe	4	1	-	-	-	3	-	-	*	
Portage	16	1	*	*	1	5	*	-	9	
Waupaca	3	2	*	-	*	1	*	-	*	
Waushara	4	1	-	-	-	2	-	-	1	
Wood	20	5	*	*	*	5	-	-	10	
Total	225	61	1	5	3	68	*	*	75	12

WISCONSIN (cont'd)

District & county[1]	All species	Aspen	Balsam	Birch	Hemlock	Pine	Spruce	Tamarack	Misc. hdwds.	Residue & chips[2]
	(Thousand standard cords, roughwood basis)									
SOUTHWESTERN:										
Buffalo	*	-	-	*	-	*	-	-	-	
Crawford	2	-	-	-	-	-	-	-	2	
Dunn	*	-	-	-	-	*	-	-	-	
Grant	5	-	-	-	-	-	-	-	5	
Iowa	3	-	-	-	-	-	-	-	3	
Pepin	*	-	-	-	-	-	-	-	*	
Polk	1	-	-	-	-	1	-	-	*	
Richland	1	-	-	-	-	-	-	-	1	
Sauk	*	-	-	-	-	-	-	-	*	
Total	17	-	-	*	-	1	-	-	11	5
SOUTHEASTERN:										
Brown	*	*	-	-	-	-	-	-	*	
Columbia	1	*	-	-	-	*	-	-	1	
Door	*	*	-	-	-	-	-	-	-	
Green Lake	*	-	-	-	-	*	-	-	-	
Outagamie	2	2	*	-	-	-	*	-	*	
Total	4	2	*	-	-	*	*	-	1	1
State total	1,244	603	57	41	52	168	19	4	224	76

1/ Includes only those counties that supplied pulpwood in 1964.

2/ County figures are not available.

* Less than 500 cords.

PULPWOOD PRODUCTION BY COUNTY AND SPECIES, 1964

MICHIGAN

District & county[1]	All species	Aspen	Balsam	Birch	Hemlock	Pine	Spruce	Tamarack	Misc. hdwds.	Residues & chips[2]
	(Thousand standard cords, roughwood basis)									
E.½ UP. PEN.:										
Alger	15	4	2	*	*	7	1	*	1	
Chippewa	31	5	4	2	-	12	7	1	*	
Delta	71	32	18	3	3	6	7	*	2	
Luce	26	3	4	1	1	13	4	*	*	
Mackinac	10	3	2	1	-	3	1	-	*	
Menominee	88	59	10	1	5	1	9	1	2	
Schoolcraft	35	6	7	6	1	9	4	*	2	
Total	282	112	47	14	10	51	33	2	7	6
W.½ UP. PEN.:										
Baraga	43	25	3	*	4	3	5	*	3	
Dickinson	56	43	4	1	1	2	5	*	*	
Gogebic	52	22	3	*	17	*	2	*	8	
Houghton	63	18	2	1	18	7	1	*	16	
Iron	68	43	7	1	3	1	5	1	7	
Keweenaw	9	1	4	-	-	-	4	-	-	
Marquette	85	35	9	2	*	27	12	*	*	
Ontonagon	54	19	1	1	6	*	1	*	26	
Total	468	206	33	6	49	40	35	1	60	38
N.½ LOW. PEN.:										
Alcona	55	45	*	2	-	3	*	-	5	
Alpena	13	9	1	1	-	*	*	-	2	
Antrim	1	1	-	*	-	-	-	-	-	
Arenac	*	*	-	*	-	-	-	-	*	
Benzie	3	2	-	*	-	-	-	-	1	
Charlevoix	1	1	-	*	-	-	-	-	*	
Cheboygan	12	9	-	*	-	3	-	-	*	
Clare	23	21	*	1	-	*	*	-	1	
Crawford	29	4	-	1	-	21	-	-	3	
Emmett	*	*	-	-	-	*	-	-	-	
Gladwin	2	2	-	*	-	-	-	-	*	
Grand Traverse	11	6	-	1	-	3	-	-	1	
Iosco	15	6	*	*	-	8	1	-	*	
Kalkaska	7	4	-	*	-	2	-	-	1	
Lake	44	16	-	1	-	15	-	-	12	
Leelanau	*	-	-	-	-	*	-	-	-	
Manistee	31	12	-	1	-	2	-	-	16	
Mason	26	12	-	1	-	3	-	-	10	
Mecosta	18	16	-	*	-	*	-	-	2	
Midland	*	*	-	-	-	-	-	-	-	
Missaukee	19	10	-	1	-	4	-	-	4	
Montmorency	39	28	1	2	-	3	1	-	4	
Newaygo	29	26	-	*	-	1	-	-	2	
Oceana	13	13	-	*	-	*	-	-	*	
Ogemaw	17	9	*	1	-	7	*	-	*	
Osceola	17	13	-	*	-	*	-	-	4	
Oscoda	45	26	*	2	-	16	-	-	1	
Otsego	2	2	*	*	-	*	*	-	*	
Presque Isle	19	13	2	1	-	*	1	-	2	
Roscommon	24	11	-	1	-	10	-	-	2	
Wexford	24	15	-	1	-	5	-	-	3	
Total	539	332	4	18	-	106	3	-	76	-

MICHIGAN (cont'd)

District[1] & county	All species	Aspen	Balsam	Birch	Hemlock	Pine	Spruce	Tamarack	Misc. hdwds.	Residues & chips[2]
	(Thousand standard cords, roughwood basis)									
S.½ LOW. PEN.:										
Allegan	2	1	-	-	-	-	-	-	1	
Barry	1	*	-	-	-	-	-	-	1	
Berrien	1	*	-	-	-	-	-	-	1	
Branch	*	*	-	-	-	-	-	-	-	
Calhoun	*	*	-	-	-	-	-	-	*	
Cass	*	-	-	-	-	-	-	-	*	
Eaton	*	*	-	-	-	-	-	-	*	
Ionia	*	*	-	-	-	-	-	-	-	
Isabella	6	6	-	-	-	*	-	-	*	
Kalamazoo	*	*	-	-	-	*	-	-	*	
Kent	1	1	-	-	-	*	-	-	-	
Lapeer	3	3	-	-	-	-	-	-	-	
Montcalm	9	9	-	-	-	*	-	-	*	
Muskegon	1	*	-	-	-	1	-	-	-	
Ottawa	*	*	-	-	-	*	-	-	-	
St. Clair	*	*	-	-	-	-	-	-	-	
Sanilac	*	*	-	-	-	-	-	-	-	
Tuscola	5	5	-	-	-	-	-	-	-	
Van Buren	*	*	-	-	-	-	-	-	*	
Wayne	*	*	-	-	-	-	-	-	-	
Total	32	25	-	-	-	1	-	-	3	3
State total	1,321	675	84	38	59	198	71	3	146	47

1/ Includes only those counties that supplied pulpwood in 1964.

2/ County figures are not available.

* Less than 500 cords.

REPORTS ON PULPWOOD PRODUCTION PUBLISHED BY THE LAKE STATES FOREST EXPERIMENT STATION

Reports of pulpwood production have been published by the Station since 1946. One group of short 2-page Notes gives information by State and species. Another group of longer reports begun in 1959 gives more detailed information by County. All of these publications were prepared by Arthur G. Horn.

The longer reports are:

Pulpwood Production in Lake States Counties.
1959 data: Station Paper 85, 13 pp.
1960 data: Station Paper 94, 28 pp.
1961 data: Station Paper 106, 18 pp.
1962 data: Research Paper LS-5, 16 pp.
1963 data: Resource Bulletin LS-1, 17 pp.

The 2-page Notes are:

Aspen Takes Lead as Pulping Species in Lake States (1946 data). Tech. Note 288.
Lake States Pulpwood Production Declines in 1947. Tech. Note 301.
Near Record Cut of Pulpwood in Lake States — 1948. Tech. Note 320.
Pulpwood Harvest Declines to Prewar Level in Lake States — 1949. Tech. Note 336.
Lake States Pulpwood Production Reverses Trend, 1950. Tech. Note 364.
Ten Years' Pulpwood Production in the Lake States (1942-1951). Tech. Note 384.
1951 Lake States Pulpwood Production Reaches All-Time High. Tech. Note 398.
1952 Lake States Pulpwood Production Continues at High Level. Tech. Note 399.
Aspen Makes Up Nearly One-Half of 1953 Pulpwood Cut in Lake States. Tech. Note 418.
Production of Pulpwood Continues at High Level in the Lake States, 1954. Tech. Note 436.
Lake States Pulpwood Production Shows Increase in 1955; Canadian Imports Decrease. Tech. Note 456.
Some Highlights of Pulpwood Production in the Lake States, 1946-1955. Tech. Note 457.
Lake States Pulpwood Production Reaches New High, 1956. Tech. Note 495.
Lake States Pulpwood Production Remains High — Hardwood Cut Climbs, 1957. Tech. Note 529.
Trend of Pulpwood Harvest Up in Wisconsin, Particularly in Central Area (1957). Tech. Note 531.
Lake States Pulpwood Production and Imports Decline in 1958. Tech. Note 558.
Lake States Pulpwood Production Exceeds 3 Million Cords, 1959. Tech. Note 588.
Lake States Pulpwood Production Up 11 Percent in 1960. Tech. Note 606.
Production and Imports of Pulpwood Decline in the Lake States, 1961. Tech. Note 624.
Lake States Pulpwood Production Up While Canadian Imports Drop to All-Time Low, 1962. Res. Note LS-23.
Lake States Pulpwood Cut Continues to Climb: Wisconsin Takes Lead in Pulpwood Production (1963). Res. Note LS-48.
Lake States Pulpwood Production Levels Off, 1964. Res. Note LS-65.

THE FOREST SERVICE CREED

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